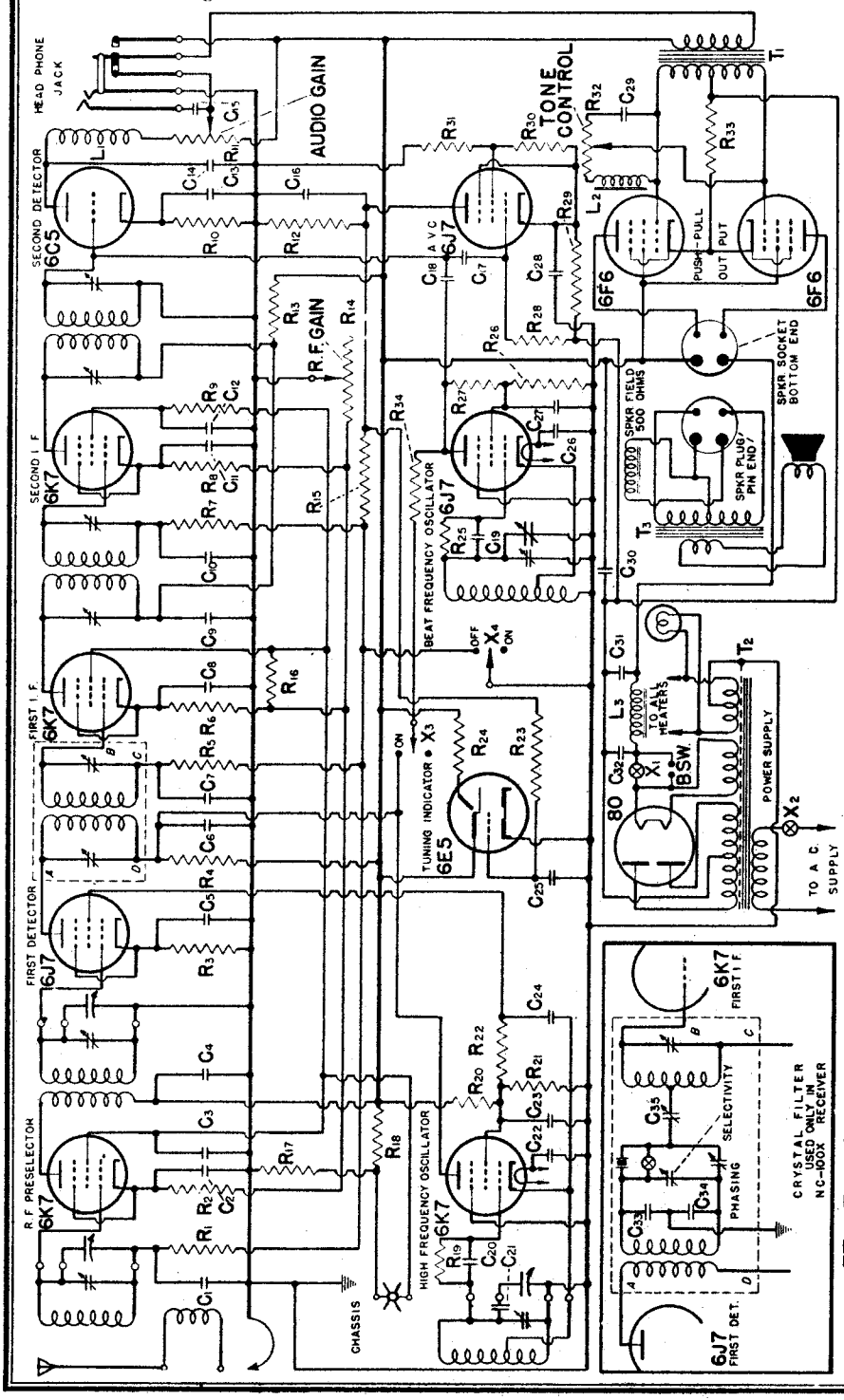
MODEL NC-100
Schematic, Parts

NATIONAL COMPANY, INC.

TYPE NC-100 RECEIVER

C_{24}	H.F. Oscillator Coupling	.01 mfd.	400 volt	C_{34}	Crystal Filter Bridge	.0001 mfd.	Mica
C_{25}	Tuning Indicator Grid Filter	.01 mfd.	400 volt	C_{35}	Crystal Filter Coupling	35 mmf.	Variable
C_{26}	C.W. Oscillator Heater Bypass	.1 mfd.	200 volt	X_1	B+ (stand-by) Switch		
C_{27}	C.W. Oscillator Screen Bypass	.1 mfd.	200 volt	X_2	AC On-Off Switch		
C_{28}	AVC Cathode Bypass	.1 mfd.	200 volt	X_3	C.W. Oscillator Switch		
C_{29}	Tone Control	.01 mfd.	400 volt	X_4	AVC On-Off Switch		
C_{30}	B-Supply Filter	8 mfd.	450 volt	L_1	2nd Det. I.F. Choke	7. mh.	
C_{31}	B-Supply Filter	8 mfd.	450 volt	L_2	Tone Filter Choke	18. Henry	
C_{32}	B-Supply Filter	8 mfd.	450 volt	L_3	B-Supply Filter Choke	20. Henry	
C_{33}	Crystal Filter Bridge	.0001 mfd.	Mica				

T_1 Push-Pull Input Audio Transformer 4:1 Ratio
T_2 Power Transformer
T_3 Output Transformer Mounted on Speaker



IF PEAK 456 KC

R_1	R.F. Grid filter	.5 megohm	½ watt	R_{21}	H.F. Oscillator Voltage Divider	100,000 ohms	½ watt	C_4	R.F. and H.F. Osc. Plate Bypass	1 mfd.	400 volt
R_2	R.F. Cathode Bias	350 ohms	½ watt	R_{22}	1st Det. Screen Filter	100,000 ohms	½ watt	C_7	1st Det. Cathode Bypass	.1 mfd.	200 volt
R_3	1st Det. Cathode Bias	5000 ohms	½ watt	R_{23}	Tuning Indicator Grid Filter	.5 megohm	½ watt	C_6	1st Det. Plate Filter	.1 mfd.	400 volt
R_4	H.F. Circuit B+ Filter	2000 ohms	½ watt	R_{24}	Tuning Indicator Target	.1 megohm	½ watt	C_7	1st I.F. Grid Filter	.01 mfd.	400 volt
R_5	1st I.F. Grid Filter	.5 megohm	½ watt	R_{25}	C.W. Oscillator Grid Leak	50,000 ohms	½ watt	C_8	1st I.F. Cathode Bypass	.1 mfd.	200 volt
R_6	1st I.F. Cathode Bias	350 ohms	½ watt	R_{26}	C.W. Oscillator Voltage Divider	100,000 ohms	½ watt	C_9	1st and 2nd I.F. Plate Filter	.1 mfd.	400 volt
R_7	2nd I.F. Grid Filter	.5 megohm	½ watt	R_{27}	C.W. Oscillator Voltage Divider	100,000 ohms	½ watt	C_{10}	2nd I.F. Grid Filter	.01 mfd.	400 volt
R_8	2nd I.F. Cathode Bias	500 ohms	½ watt	R_{28}	AVC Grid Return	.5 megohm	½ watt	C_{11}	2nd I.F. Cathode Bypass	.1 mfd.	200 volt
R_9	2nd I.F. Screen Filter	2000 ohms	½ watt	R_{29}	AVC Voltage Divider	350 ohms	1 watt	C_{12}	2nd I.F. Screen Filter	.1 mfd.	200 volt
R_{10}	2nd Det. Cathode Bias	20,000 ohms	½ watt	R_{30}	AVC Voltage Divider	1000 ohms	2 watt	C_{13}	2nd Det. Cathode Bypass	10. mfd.	50 volt
R_{11}	Audio Volume Control	50,000 ohm potentiometer		R_{31}	AVC Voltage Divider	1000 ohms	2 watt	C_{14}	2nd Det. Plate Bypass	.001 mfd.	Mica
R_{12}	AVC Plate	.5 megohm	½ watt	R_{32}	Tone Control	500,000 ohm potentiometer		C_{15}	Phone Coupling	.1 mfd.	400 volt
R_{13}	I.F. B+ Filter	2000 ohms	½ watt	R_{33}	Output Cathode Bias	250 ohms	2 watt	C_{16}	AVC Plate Bypass	.1 mfd.	200 volt
R_{14}	R.F. Gain Control	10,000 ohm variable		R_{34}	C.W. Oscillator Plate Filter	.25 megohm	½ watt	C_{17}	AVC Grid Coupling	.0001 mfd.	Mica
R_{15}	Common Grid Filter	.5 megohm	½ watt					C_{18}	C.W. Oscillator Coupling	2 mmf.	Special
R_{16}	Gain Control Bleeder	50,000 ohms	½ watt					C_{19}	C.W. Oscillator Grid	.001 mfd.	Mica
R_{17}	Voltage Divider	20,000 ohms	2 watt					C_{20}	H.F. Oscillator Grid	.0001 mfd.	Mica
R_{18}	Voltage Divider	20,000 ohms	2 watt	C_1	R.F. Grid Filter	.01 mfd.	400 volt	C_{21}	H.F. Oscillator Series Padding — Different for each range		
R_{19}	H.F. Oscillator Grid Leak	20,000 ohms	½ watt	C_2	R.F. Cathode Bypass	.1 mfd.	200 volt				
R_{20}	H.F. Oscillator Voltage Divider	50,000 ohms	½ watt	C_3	R.F. and 1st I.F. Screen Bypass	.1 mfd.	200 volt	C_{22}	H.F. Oscillator Heater Bypass	.01 mfd.	400 volt
								C_{23}	H.F. Oscillator Screen Bypass	.1 mfd.	200 volt

MODEL NC-100
Chassis, Trimmers
Alignment, Socket

NATIONAL COMPANY, INC.

Preliminary Adjustments — The I.F.

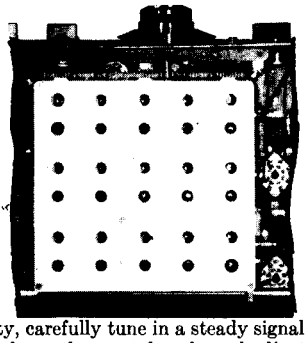
All the I.F. transformers are now adjusted for maximum signal. This adjustment need not be made with any great degree of precision, since the crystal will not oscillate at exactly the same frequency to which it will be resonant in the receiver. The Phasing control should be set at "0".

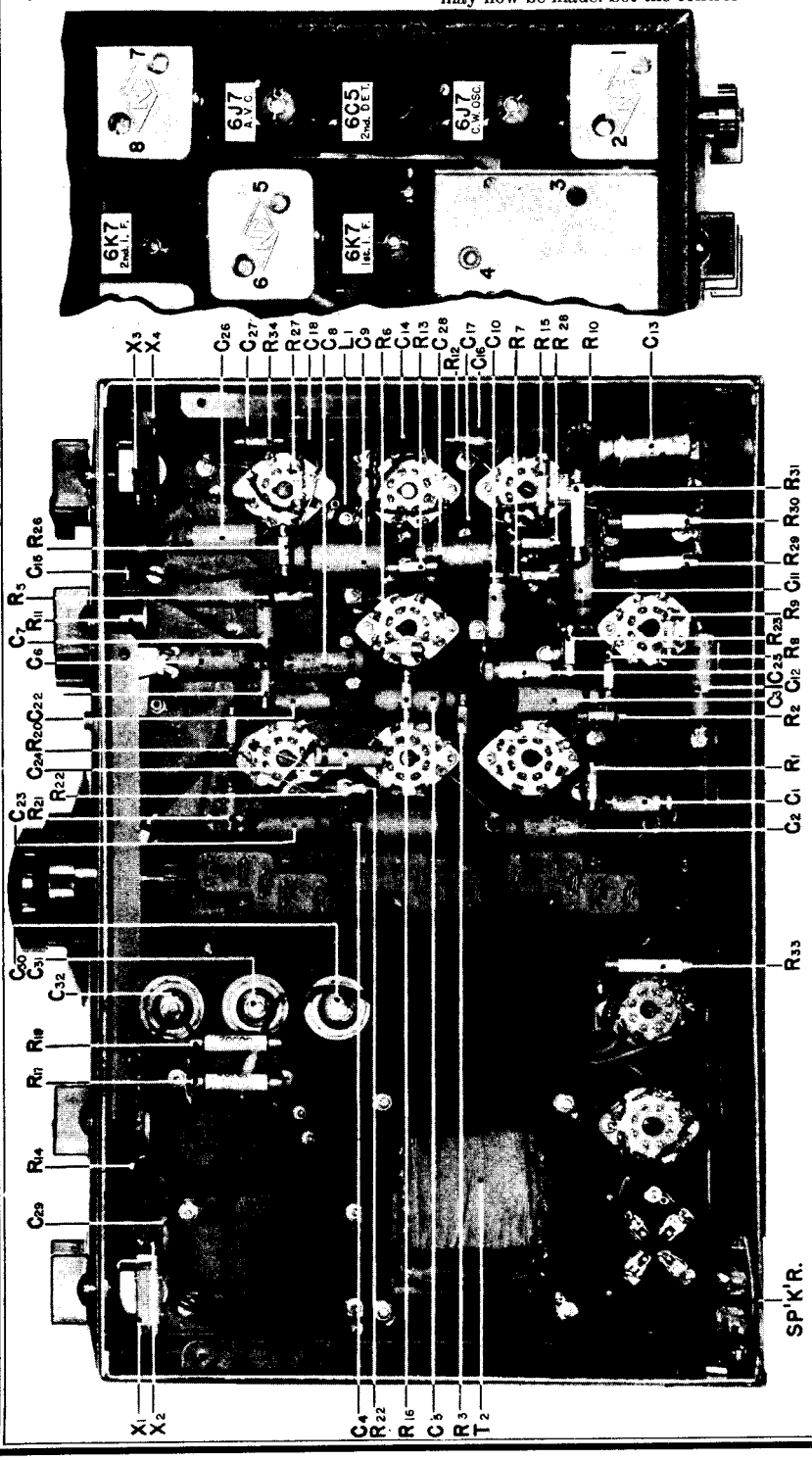
The I.F. adjustments are indicated on the layout diagram, page 4, Nos. 4 to 8 (inclusive).

The crystal filter output coupling condenser, adjustment No. 3, serves as a fixed I.F. gain control and, in general, **should not** be touched.

The crystal may now be removed from the oscillator and installed in the receiver. Throw the switch to connect the crystal for single signal reception. Set the selectivity control for maximum selectivity; that is, with the pointer rotated all the way to the right. Now, tune in a steady signal from a local oscillator or monitor. Tuning very slowly across the carrier, there should be one point at which the signal will peak very sharply. The audio pitch of this peak will be nearly the same as the pitch of the beat used when the crystal oscillator was being picked up.

The final adjustment of the I.F. transformers may now be made. Set the control for maximum selectivity, carefully tune in a steady signal until it is exactly on the crystal peak, and adjust each of the I.F. transformer tuning condensers for maximum signal strength. (*In almost all cases where the I.F. amplifier has once been aligned to the crystal, this check is all that would be required, and it is not necessary to put the crystal in an external oscillator.*) Even if the I.F. amplifier is considerably out of alignment, the crystal frequency may be found by employing a strong local signal from a monitor or frequency meter, slowly tuning across it while listening for a peak in the audio beat note. If the peak is found at a very high audio pitch it will be necessary to change the tuning of the beat oscillator so that the audio peak will be well inside the limits of audibility. It is probable that if the peak signal is found at all, the I.F. amplifier will not be far out of tune and the readjustments required will be small.





R.F. and H.F. Oscillator Alignment

Complete alignment of any one coil range is made as follows: Set the tuning dial near the high frequency end of the range between 470 and 490, check the dial reading against the calibration curve by means of an accurate test oscillator or a signal of known frequency; readjustment should be made if the dial reading is in error by more than five or six divisions. In checking the error, disregard the numbers between 495 and 500.

Correction for calibration is made by adjustment of the high frequency oscillator trimmer (nearest the front of the receiver).

With calibration correct at the high frequency end of the range, the dial should be rotated toward the lower numbers. The background noise may vary slightly over the range but should not get appreciably weaker except in the case of the .54 to 1.3 mc. coils. Ganging is checked by pressing one of the outside rotor plates of the oscillator condenser sideways toward the stator, but not enough to make the plates touch. The same check may be applied to the first detector and R.F. tuning condensers. Any bending of the rotor plates should make the background noise definitely weaker. A similar check can, of course, be made by bending the rotor plates out, away from the stator, care being taken not to bend the plates so far that they will not return to their original position.

On the two highest frequency ranges, it may be possible to make the initial oscillator adjustment incorrectly. There are two settings of the oscillator trimmer condenser which will tune in the desired signal at the proper point on the dial; of these, the higher frequency setting (least trimmer capacity) is correct. In checking the ganging of the 13.5 to 30. mc. range, the R.F. condenser has little effect upon the background noise at the low frequency end of the scale and at this one point it is better to use a test signal. Should any error in tracking be found on one range, it is probable that the same error will be present on all ranges and correction may be made by permanently bending the rotor plates of the tuning condenser section in question.